



## Reducing disease risks in captive amphibians and protecting our wild native amphibians from invasive disease

As an amphibian keeper, it is essential to do all you can to ensure disease does not pose a risk to captive or wild amphibians. In addition to the newly-emerged *Batrachochytrium salamandrivorans*, there are other amphibian pathogens that are a cause for concern, including *Batrachochytrium dendrobatidis* and ranaviruses. This leaflet provides information and guidance on what you can do to reduce disease risks to captive and wild amphibians in Europe.

**Chytrid fungi** - There are two species of chytrid fungi known to infect amphibians: *Batrachochytrium dendrobatidis* (Bd for short) and *Batrachochytrium salamandrivorans* (Bsal for short). Bd can infect and kill frogs, toads, newts, salamanders and caecilians and is a major cause of amphibian population declines (including species extinctions) globally. Bsal is a recently discovered species of chytrid fungus that is known to infect newts, salamanders, frogs and toads but is only known to kill newts and salamanders. Often amphibians can carry chytrid infection without signs of disease for weeks or months, during which time they are infectious to other animals. Bsal is thought to have come from Asia and to be spread internationally mainly by the amphibian trade. Unless all concerned (e.g. pet traders, scientists and amphibian keepers) take great care and apply some simple biosecurity measures, there is a risk that it could be further introduced to captive and wild amphibian populations across Europe and elsewhere, with potentially disastrous effects. To date, Bsal has become established in the **Netherlands**, **Belgium** and **Germany** where it is causing devastating population declines in wild salamanders. In 2019, Bsal was detected in wild newts in **Spain** for the first time, where it is subject to an ongoing eradication programme.

Chytrid fungi can be spread by direct contact between animals or via contaminated materials, such as water, equipment, soil, gravel, aquatic plants, etc. The fungi can persist in the environment without amphibians for several weeks.

For both Bd and Bsal, non-invasive skin swabs can be used to diagnose infection. For amphibians in captivity, treatments are available for sick animals and to eradicate infection from those carrying chytrid fungi.

**Ranaviruses** - There are several strains of ranavirus and some have been linked to amphibian mass mortalities around the world, including in Europe. In Spain and the UK they have been implicated in long-term amphibian population declines. Ranaviruses are present in the international amphibian trade and novel strains could be extremely dangerous to European wildlife, especially to frogs and toads, but also to newts, fish and reptiles. Like chytrid fungi, ranaviruses are spread through direct contact between animals or from contaminated materials. These viruses can remain infectious for very long periods of time (months or years) in water and pond sediment. As internal tissues are required to reliably diagnose infection in otherwise healthy animals, there is currently no robust diagnostic test for live animals that might be carrying ranavirus. No treatment is available for ranavirus infection.

**Neither chytrid fungi nor ranaviruses can infect or cause disease in people.**

### Signs of disease

These amphibian diseases cannot be diagnosed based only on clinical signs and laboratory testing is required to provide diagnoses. Many of the signs of disease listed below (especially inappetence, skin lesions, excessive skin sloughing, lethargy and loss of coordination) can also be due to suboptimal husbandry practices and probably also to other diseases caused by as yet unknown pathogens.

Newts or salamanders sick with **Bsal** can lose weight and body condition, develop skin ulcers and may become listless or show incoordination.

Amphibians sick with **Bd** infection may have reddening or excessive shedding of their skin, ulceration of their toes, or unusual behaviours such as terrestrial animals sitting in water for longer periods than normal.

Amphibians sick with **ranavirus** may develop skin ulcers or reddening of the skin. In acute cases, affected animals might vomit bloody mucus or pass blood from the vent.

**Amphibians suffering from any of these diseases, however, are often not seen showing any signs of illness and are simply found dead.**

Further information on the signs of different amphibian diseases can be found on the GWH website:

[www.gardenwildlifehealth.org/disease-factsheets](http://www.gardenwildlifehealth.org/disease-factsheets)

## If you find sick or dead amphibians

**Please report any sick or dead amphibians found in the wild.**

In the UK, report to Garden Wildlife Health at: [www.gardenwildlifehealth.org](http://www.gardenwildlifehealth.org)

In mainland Europe, report to the relevant contact found on the “Report cases” tab at: [www.bsaleurope.com](http://www.bsaleurope.com)

## What else can you do?

Following the advice below will help minimise the risk of inadvertently spreading amphibian diseases within or between captive collections or to wild populations:

- **Never transfer wild amphibians between sites or from captivity into the wild.** Do not stock ponds with spawn/tadpoles/adult amphibians – they will colonise new ponds naturally (and often surprisingly quickly). The only exceptions to this are translocations which are conducted for development mitigation or conservation breeding initiatives and are subject to disease risk analysis and management.
- **Manage all amphibians as if they are infected.** Do not assume that a healthy-looking animal is free of infection; some animals can act as carriers without exhibiting signs of disease.
- **Quarantine and screen new arrivals for chytrid infection.** As of February 2018, [European Union \(EU\) legislation](#) requires all newts and salamanders being moved internationally into or within the EU to undergo a 6-week quarantine period with testing, or (for EU movements only) a treatment programme. In the UK, this must be carried out under the supervision of the Fish Health Inspectorate (FHI), Cefas. Further information can be found at: [www.gov.uk/government/publications/the-import-of-salamanders-and-newts](http://www.gov.uk/government/publications/the-import-of-salamanders-and-newts). To apply to register an appropriate establishment or to import or export newts or salamanders please contact the FHI at [fhi@cefas.co.uk](mailto:fhi@cefas.co.uk).
- **Know the health status of your collection.** Get your animals tested routinely and ensure any dead amphibians are submitted for post-mortem examination. A list of European laboratories offering Bsal testing can be found at [www.bsaleurope.com/laboratories](http://www.bsaleurope.com/laboratories).
- **Avoid keeping amphibians in outdoor enclosures.** Outdoor-housed amphibians may come into contact with native wild amphibians and infect them with disease agents (even if the captive animals appear healthy).
- **Do not clean tanks or vivaria outside.** There is a risk of contaminating areas used by wild animals.
- **Dispose of dead animals responsibly.** If dead animals are not submitted for testing, they should be incinerated or buried in such a way that scavenging animals cannot access them.
- **Disinfect all wastewater from amphibian enclosures.** Waste water should be treated with disinfectant according to manufacturer’s instructions and discarded via the sewer system. See “[Guidelines for safe disposal of waste water and other materials from captive amphibian enclosures](#)” on the GWH website for more information.
- **Dispose of used substrates responsibly.** Substrates (e.g. soil, sand, gravel, etc.) can harbour infections so should be sent for incineration by a registered company that can dispose of clinical waste (e.g. those used by veterinary practices). If this is not possible, substrates should be disinfected, desiccated or heat-treated before being disposed of with household refuse for collection by your local council. See “[Guidelines for safe disposal of waste water and other materials from captive amphibian enclosures](#)” on the GWH website for more information.
- **Disinfect equipment between enclosures or have dedicated equipment for each enclosure.** This will avoid spreading infection within a collection. Equipment and furnishings should be regularly cleaned and disinfected, with waste water disinfected and discharged into the sewer system.
- **Register with a veterinary surgeon who has knowledge of amphibians and seek advice on keeping your collection healthy.** See the special interest list on [www.bvzs.org](http://www.bvzs.org) (in the UK) or using the “find a specialist” function on [www.eczm.org](http://www.eczm.org) (across Europe).